

What is claimed is:

- 1           1.     A plasma reactor electrode comprising:  
2                 a first, upper plate for the transfer of RF energy;  
3                 a second, lower plate for the transfer of RF energy; and  
4                 a plurality of pins connecting the upper and lower plates to facilitate  
5                 thermal conductivity during RF energy transfer.
- 1           2.     An electrode as claimed in claim 1, further comprising a dielectric cover  
2                 disposed below the lower plate.
- 1           3.     An electrode as claimed in claim 2, wherein said dielectric cover is bonded  
2                 to said lower plate.
- 1           4.     An electrode as claimed in claim 1, wherein said electrode is part of a  
2                 showerhead assembly, with holes extending through said lower plate and said cover.
- 1           5.     An electrode as claimed in claim 1, further comprising an outer ring  
2                 surrounding said upper and lower plates; a first O ring disposed between said upper plate  
3                 and said outer ring; and the second O ring between said lower plate and said outer ring;  
4                 wherein said first and second O rings, said outer ring, and said first and  
5                 second plates are configured to form a plenum chamber; and  
6                 wherein a plurality of holes are formed to provide uniform gas distribution  
7                 in conjunction with said plenum chamber.

1           6.       An electrode as claimed in claim 2, wherein said dielectric cover is made  
2 of a material selected from the group consisting of ceramic and quartz.

1           7.       An electrode as claimed in claim 5, wherein said outer ring comprises a  
2 material selected from the group consisting of ceramic and quartz.

1           8.       An electrode as claimed in claim 1, further comprising a lid disposed over  
2 said upper plate.

1           9.       An electrode as claimed in claim 8, wherein said lid is made of aluminum.

1           10.      An electrode as claimed in claim 1, wherein said plurality of pins comprise  
2 aluminum, and said upper and lower plates comprise aluminum.

1           11.      A method of forming a plasma reactor electrode, comprising:  
2                   attaching a first, upper plate to a second, lower plate with a plurality of  
3 pins;  
4                   attaching a dielectric cover below said lower plate; and  
5                   providing an outer ring around said upper and lower plates, with respective  
6 first and second O rings between said first, upper plate and said outer ring, and  
7 between said second, lower plate and said ring, so as to form a plenum chamber  
8 among said upper and lower plates, said first and second O rings, and said outer  
9 ring.

1           12.      A method as claimed in claim 11, wherein said pins, and said first and  
2 second plates are made of aluminum, and said dielectric cover is made from a material

3 selected from the group consisting of ceramic and quartz, said outer ring being made from  
4 a material selected from the group consisting of ceramic and quartz.

1 13. A method as claimed in claim 11, further comprising providing a lid over  
2 said first, upper plate, said lid having an opening for the insertion of processed gas.

1 14. A plasma reaction chamber comprising:  
2 a chamber; and  
3 a plasma reactor electrode, said electrode comprising a first, upper plate  
4 for the transfer of RF energy, a second, lower plate for the transfer of RF energy,  
5 and a plurality of pins for connecting said first and second plates to facilitate  
6 thermal conductivity during RF energy transfer.

1 15. A chamber as claimed in claim 14, further comprising an outer ring  
2 surrounding said upper and lower plates, and respective O rings between said upper plate  
3 and said outer ring, and said lower plate and said outer ring, so as to form a plenum  
4 chamber with said upper and lower plates, said outer ring, and said O rings.

1 16. A chamber as claimed in claim 14, further comprising a dielectric cover  
2 attached to said lower plate.